



REPORT

OF THE

Agricultural Department

ANTIGUA

1939.

1940.

REPORT ON THE AGRICULTURAL DEPARTMENT, ANTIGUA, FOR THE YEAR 1939.

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Foreword.

In its present organization the Agricultural Department in Antigua is divided into two separate sections. In the accompanying report the Agricultural Superintendent outlines the statistical position of the main agricultural industries during the year 1939 and presents an account of the section of the Department under his charge during the same period.

2. The year 1939 will go down on record as one of the most difficult years for agricultural production that the Island has experienced. Drought conditions prevailed until the end of September and were renewed again in the last month of the year.

3. The total value of the chief products of agriculture exported during 1939 amounted to £247,165, compared with the average of £251,923 for the previous three years. Of this amount 94 per cent. represents the value of sugar and its by-products and 5 per cent the value of cotton lint.

4. Rainfall during the growing period of the sugar crop reaped in 1939 was very unfavourably distributed and although good yields were obtained in some areas the average yield was low, total production amounting to 22,325 tons. The average export value of sugar was £10. 18. 0. per ton, 16 per cent. higher than the corresponding figure for the previous year.

5. During the season of 1938-39 there was a further extension of the cultivation of Sea Island cotton both in Antigua and in Barbuda, the acreage amounting to approximately 2,000 acres. Total production of cotton lint amounted to 247,513 pounds, equivalent to a yield of 124 pounds per acre. Disposal of the crop was fairly readily effected at good prices.

6. Food production was severely restricted by the prolonged drought. But with the onset of rains in October great efforts were made to ensure increased food production in view of the possibility of supplies from external sources being reduced by war conditions.

7. The definition of a comprehensive and long range agricultural policy for the Island was deferred pending the presentation of the recommendations of the West India Royal Commission of 1939. The main functions of this section of the Agricultural Department during the year have however been the continuation of experiments with the object of finding more economic and efficient methods for application in sugar cane agriculture; the supply of cotton seed for planting and the maintenance of an inspection service for cotton pest control as an aid to the better organization of the cotton industry; the maintenance of an agricultural experiment station for crop investigational work, plant multiplication plots and plant nurseries; and the supervision of certain land settlements. In addition, the Agricultural Superintendent has been responsible for the many miscellaneous duties which normally devolve upon the chief executive agricultural officer of the Island.

8. The scheme of sugar cane experiments initiated in 1933 in co-operation with the Sugar Cane Investigation Committee and under the direction of Mr. P. E. Turner, Sugar Agronomist of the Trinidad Department of Agriculture, was successfully carried on during the year and valuable progress was made. The importance of the results thus far obtained from the scheme and the very great benefits which can be derived therefrom when put into practice were particularly evident under the trying conditions caused by the severe drought in 1939.

9. In regard to the cotton industry, arrangements were made as usual for the multiplication and distribution of pedigree Sea Island cotton seed supplied by the cotton breeding station in Montserrat. A cotton varietal trial was conducted and the inspection service for the control of cotton pests was maintained.

10. The inauguration of a separate Forestry Board and the enactment of forestry legislation are welcomed as preliminary steps toward the institution of measures designed to check destructive bush fires and to effect soil conservation.

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June, 1940.

Report on the Agricultural Department, Antigua

FOR THE PERIOD JANUARY TO DECEMBER, 1939.

SECTION 1.

GENERAL AGRICULTURE.

Weather Conditions.

The average rainfall during 1939 was 29.70 ins. This is the third lowest rainfall registered since 1874, the year in which island rainfall records commence. Distribution of the 1939 rainfall moreover was very unfavourable, over 50% of the total having fallen during the months of October and November.

As a result of these unfavourable conditions the 1940 sugar crop was expected to be in the region of 12,000 tons a figure considerably below that regarded as a normal crop in recent years although greatly in excess of that reaped in the year following the 1930 drought.

Chief Crops.

A. Sugar. The average rainfall for 1938 amounted to 44.75 ins., which is 1.95 ins. above the mean rainfall of the past sixty five years. Distribution however was unsatisfactory: a very low rainfall fell during the first five and a half months of the year, followed by abnormally heavy rains at the end of June and by a dry spell again in September. Very dry weather was experienced during the 1939 crop season and as a result of this, actual production was considerably below the original estimate of 24,000 tons—the output being 22,125 tons, grey crystals and 200 tons muscovado.

The average yield of cane per acre was 15.0 tons compared with 16.2 tons in 1938, 25.1 tons in 1937, 16.3 tons in 1936, 15.0 tons in 1935, 15.2 tons in 1934 and 20.1 tons in 1933.

There was a welcome increase in the price of sugar during the year: the 20,547 tons exported sold at an average of £10. 18. 0. per ton (including value of the special preference certificates).

The reduction in damage from moth borer recorded in the report for 1938 was maintained during 1939 while the white grub (*Lachnosterna Antiguae*) which was responsible for considerable damage in young fields at the end of 1938 has hardly been reported during the 1939 planting season.

The comparative freedom from root disease reported in recent years has again been observed during 1939 despite the abnormally severe drought.

The recovery of cane fields on estates in most parts of the island since the breaking of the rains in October has been remarkably good and is in no small measure due to the results of the investigational work conducted during the last six years.

It has been clearly demonstrated that fields planted with suitable varieties in the month of November, properly cultivated and manured have withstood the severe drought while late planted fields have in many cases never been properly established. Peasants who in most cases habitually plant late will reap hardly any crop during 1940.

The Bendals Sugar Factory was purchased by the Antigua Sugar Factory at the close of the 1939 crop and the latter factory will deal with the whole island crop in the future with the exception of the small area supplying the muscovado factory at Montpelier.

B. Cotton. The 1939 cotton crop was reaped from about 2,000 acres (including 400 acres in Barbuda). The total production was 247,513 lb. lint (242,116 lb. clean and 5,397 lb. stains) an average return of 124 lb. per acre.

Prices realised were rather better than those of 1938—viz. 1/5 to 1/8 per lb. clean lint.

Two ginneries—the Antigua Cotton Factory and the Osborne Ginnery again operated during 1939 in Antigua and the Government ginnery in Barbuda handled the crop of that island.

The area planted for the 1940 crop was estimated at 2,645 acres (including 400 in Barbuda) but much damage was done by the cotton caterpillar (*Alabama argillacea*) which was unusually prevalent and the control of which was rendered difficult through a shortage of insecticides, resulting from war conditions, at the time when the attack was most severe.

As a result of the very dry weather experienced during the close season it seemed probable that pink boll worm control would be less effective than had been the case during 1938. It therefore seemed likely that the yield per acre in 1940 would be less than in 1939.

Food Supply. The question of increasing local production of food became of major importance with the outbreak of war. A local committee was appointed to stimulate estate food production and loans for the dual purpose of providing relief work and growing food crops were made to both estates and peasants.

Further information on this important subject is contained in Appendix I.

Boards of Agriculture and Forestry.

During the year a long needed forestry ordinance was enacted and the Board of Agriculture and Forestry was reformed as two separate bodies—a Board of Agriculture and a Board of Forestry.

Recommendations for the constitution of a first forest reserve were passed by the Board and submitted to the administration towards the end of the year.

Antigua Cotton Growers' Association.

Peasants cotton was again purchased at the Antigua Cotton Factory on behalf of the association; 109,262 lb. seed cotton being purchased for £1,582, i.e., approximately 3½d. per lb. followed by a further payment of £235 6. 0., i.e. about ½d. per lb.

The Fourth General Meeting of the West Indian Sea Island Cotton Association Incorporated was held in Antigua in December. Mr. E. D. Dew represented the Antigua Association.

Development of Peasant Agriculture.

The work of the Peasant Agricultural Development Department has continued to expand. In addition to marketing the increasing tomato and vegetable crops, its activities have included manufacture and marketing of corn meal on a small scale, marketing of peasants cotton and canes, encouragement of peasants cotton and cane cultivation, improvement of peasants live stock, the start of a new land settlement at Mannings and Sheriffs and particular attention to the Piccadilly settlements.

AGRICULTURAL EXPORTS 1935—1939.

The following Table shows the chief agricultural products exported during the years 1935—1939 inclusive.

Article	1935		1936		1937		1938		1939	
	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £	Quantity	Value £
Sugar (Crystals) ...	16,072 tons	151,249	19,759 tons	130,240	31,113 tons	315,577	20,683 tons	193,221	20,547 tons	223,919
Sugar (Muscovado) ...	190 "	800	100 "	1,053	314 "	3,026	160.5 "	1,249	101 "	963
Molasses (V. Pan) ...	324,562 gals	2,188	538,177 gals	3,351	593,938 gals	3,712	1,035,640 gals	10,292	543,950 gals	3,411
Molasses (Muscovado) ...	33,802 "	1,690	44,955 "	1,980	49,976 "	2,820	18,447 "	1,229	31,548 "	1,633
Rum ...	2,008 "	293	6,425 "	935	6,831 "	1,080	9,449 "	1,152	5,891 "	678
Cotton Lint ...	32,950 lb.	2,062	117,380 lb	8,988	96,940 lb	7,131	174,842 lb.	11,910	246,879 lb	14,917
Cotton Seed ...	...	...	...	...	...	...	94 tons	313	179 tons	365
Lime Juice (raw) ...	6,916 gals	305	6,106 gals	154	1,170 gals	33	2,678 gals	66	—	—
Green Limes ...	77 brls	57	94 erts.	13	577 erts.	106	155 erts	31	—	—
Lime Oil ...	56 gals	448	248 gals	1,762	36 gals	181	748 lb	560	112 gals	436
Tamarinds ...	461 brls	295	522 brls	522	497 brls	506	310 brls	279	68 brls	56
Tomatoes ...	—	—	147 erts.	30	1,988 erts.	292	5,493 erts.	639	5,860 erts.	619
Hides and Skins ...	—	204	—	232	—	246	—	207	—	7
Coconuts ...	2,300	9	20,399	72	34,607	99	42,961	86	46,050	85
Onions ...	—	—	75 erts.	25	1,610 lb.	14	1,800 lb.	19	—	22
Horses ...	8	96	6	80	3	42	9	187	3	48
Asses ...	16	64	1	6	5	9	7	13	1	6
Mules ...	1	10	—	—	—	—	—	—	—	—
		159,770		199,443		334,874		221,453		247,165

SECTION II. WORK OF THE DEPARTMENT OF AGRICULTURE. PLANT IMPORTATIONS.

During the year the following plants and seeds were imported:

Plants or Cuttings.

Cuttings of the following new varieties of sugar cane were imported from the Plant Quarantine Station in Trinidad:—

B.3254, B.3307, B.3327, B.3337, B.3371, B.3419, B.3482, B.3509, B.3518, B.3520, B.3521, B.3525, B.3540, B.35187, B.35197, B.35200, B.35204, B.35207, B.35214, B.35245, B.35247, B.37154, B.37161, B.37172, B.37174, B.37175, B.37176, B.37181, B.37193, B.37194, B.37219, B.37227, B.37259, Co.299, Co.313, Co.331, Co.352, Co.360, Co.413, and Co.432.

Of these varieties stools of each were established by the end of the year with the exception of B.37181 which failed to germinate.

Seeds.

Cotton Seed	—	160 lb. from Montserrat for use in Multiplication Plots.
" " Barbados	—	3 lb. from Barbados for Varietal Experiment.
" " V 135	—	3 lb. from St. Vincent for Varietal Experiment.
Adlay Seed	—	1 lb. from the Commissioner of Agriculture, Trinidad.
Onion Seed	—	46 lb. from Teneriffe.
Cauliflower Seed		
(Early Patna)	—	3 lb. from India.
Other Vegetable		
Seeds	—	47 lb. from United States of America.
Flower Seeds	—	1 lb. 2 ozs. from United States of America.

Plant and Seed Distribution.

The following plants and seeds were distributed during the period under review.

Cane Cuttings.

B.3439	....	....	....	....	36,941
B.34104	....	....	....	....	5,587
B.3013	....	....	....	....	5,283
B.3124	....	....	....	....	5,197
B.726	....	....	....	....	4,040
B.3127	....	....	....	....	2,277
B.H. 10.12	....	....	....	....	2,000
B.3138	....	....	....	....	1,577
Ba. 11569	....	....	....	....	1,239
F.C. 916	....	....	....	....	1,123
B.34117	....	....	....	....	110
B.34163	....	....	....	....	53
B.2935	....	....	....	....	32
Co. 213	....	....	....	....	7

65,466

Potato Cuttings.

Tomato Seedlings	....	....	....	....	4,000
Onion Seedlings	....	....	....	....	30,950
Budded Oranges	....	....	....	....	36
" Mandarins	....	....	....	....	8
" Grapefruit	....	....	....	....	15
" Tangarines	....	....	....	....	12
" Mango	....	....	....	....	56
" Avocado Pear	....	....	....	....	17
Bread Fruit	....	....	....	....	39
Bread Nut	....	....	....	....	1
White Cedar	....	....	....	....	2
Eucalyptus	....	....	....	....	72
Flamboyant	....	....	....	....	84
Mahogany	....	....	....	....	60
Whitewood	....	....	....	....	44
Palms	....	....	....	....	34
Cassia	....	....	....	....	101
Gliricidia	....	....	....	....	150
Casuarina	....	....	....	....	382
Miscellaneous ornamental	....	....	....	....	258
Onion Seed	....	....	....	....	45½lb.
Cauliflower Seed	....	....	....	....	2¼lb.
Other Vegetable Seeds	....	....	....	....	35lb.
Flower Seeds	....	....	....	....	1lb.

WORK AT GREENCASTLE EXPERIMENT STATION.

NURSERY WORK.

A. *Sugar Cane.*

The following varieties were grown as Plant Cane:—

B.H.10.12, Ba.11569, B.374, B.726, B.2935, B.3013, B.3124, B.3125, B.3127, B.3138, B.3439, B.34104, B.34117, B.34163, P.O.J.2878, P.O.J.2883, M.42, M.63 and F.C.916, together with specimen rows of B.3922, B.4507, B.4596, B.6308, B.417, S.C.12. 4, Co.213, Co.221, Co.281, Co.290, and Uba.

The following varieties were grown as First Ratoons:—

B.H.10.12, Ba.11569, B.726, B.2935, B.3013, B.3124, B.3125, B.3127, B.3138, B.3439, B.34104, B.34117, B.34163, P.O.J.2878, P.O.J.2883, Co.290, M.28, M.42, M.63 and F.C.916.

The newly imported seedlings listed in the preceding section have been planted in the nurseries and the following varieties had been extended to small plots by the end of the year:—B.3254, B.3307, B.3337, B.35187, B.35204, Co.299, Co.313, Co.331, Co.352, Co.360 Co.413 and Co.432.

B. *Fruit and Vegetables.*

Citrus Fruit. The following varieties of citrus were propagated:—

Washington Navel Orange	....	....	60
Marsh Grapefruit	....	....	20
Foster Grapefruit	....	....	9
Mandarin	....	....	20
Tangerine	....	....	18
Budded Lime	....	....	6
			153

Mangoes. The following varieties were propagated:—

Julie	....	....	....	170
Ceylon	....	....	....	12
Bombay	....	....	....	6
				188

Avocado Pears. Twenty-three plants were propagated, all of the variety Pollock.

Bread Fruit. Sixty-three plants were raised from root cuttings.

Cashew. Seventy-seven plants were grown.

Onions. 30,950 seedlings were grown for sale.

Tomatoes. 4,000 seedlings were raised and distributed and an additional lot of 6,800 was handed over to the Peasant Agricultural Development Department.

Eddoes, Yams and Sweet Potatoes:

Eddoes. Nursery plots were grown of the varieties Tannia White and Tannia Yellow.

Yams. Nursery plots were grown of the following varieties:—

Seal Top, Light Red, Bugle Horn, Crop, Lisbon and Antigua Cush Cush.

Sweet Potatoes. Nursery plots were grown of the following varieties:—

Three month, V.52, B.20, B.26, B.44, B.62, and B.64. The five varieties last mentioned are those seedlings imported during 1938 which appeared most promising under conditions existing at the experiment Station. B.26, and B.62 have been found suitable for field storage in clamps under Barbados conditions and will be extended for storage trials in Antigua.

Fruit Plots.

Citrus. The severe drought adversely affected the citrus plots and a considerable amount of watering was necessary to keep some of the trees alive. The crop was definitely smaller than that reaped in 1938.

Mangoes. The mango plots were less severely affected by the drought than was the case with the citrus plots nevertheless some watering was necessary and the crop was smaller than that reaped in 1938. The Julie and Ceylon varieties have continued their apparent superiority over the Bombay mango under conditions existing at the experiment station, although the latter has at last yielded a few fruits. The Gordon mangoes have carried fairly heavy crops but the quality has been inferior to that of the Julies and Ceylons.

Orchard. The orchard made fair progress during the year considering the very unfavourable weather. Improvement has been most marked at those places where the windbreak had been re-enforced at the end of 1938.

II EXPERIMENTAL WORK.

As is customary experiments conducted with sugar cane at the Experiment Station are included in the Section on Sugar Cane Experiments which deals chiefly with field experiments conducted by the Department in various parts of the island.

MODEL ALLOTMENT.

The report on the Model Allotment covers the period October 1st 1938 to September 30th 1939. The total expenditure during this period amounted to £31. 7. 2½, and the total revenue to £66. 7. 0½, there being a profit of £34. 19. 10.

The total expenditure since the establishment of the allotment amounted to £363. 17. 6. and the total revenue to £467. 10. 4½ leaving a profit to date of £103. 12. 10½.

During the year under review the fruit plot showed a deficit of £1. 9. 1. The total deficit on this plot is now £21. 1. 1. so that if this plot is considered apart from the remainder of the allotment the latter now shows a credit balance of £124. 13. 11½.

The statement of revenue and expenditure in connection with the individual crops is shown in Table A.

The profits on cane cultivation have been larger than was the case in 1938, but there have been reduced profits on sweet potatoes, on vegetables and on provisions (yams, eddoes and cassava).

The conclusions recorded in previous reports have again been confirmed viz. that sugar cane and sweet potatoes are the most profitable crops for the district, although profits may at times be made with provision crops, especially yams and cassava and with vegetables such as carrots and tomatoes.

As has been stated in previous reports, consideration has been given to the question of making allowance on the one hand for the cost of supervision and of the instalments of the purchase price of the allotment and on the other hand for the fact that the revenue should be credited with a sum equivalent to two days' work a week by the holder (1/6 per diem) and with sundry small sums paid for marketing, reaping of vegetables, etc., which would in many cases be done free of cost by members of the allottee's family. As both these figures are estimated at about £8 per annum, they may be disregarded and the statement of revenue and expenditure as presented may be accepted as correct.

TABLE A.

MODEL ALLOTMENT.

TABLE OF CROP EXPENDITURE AND REVENUE

Crop	Plot or Plots	Expenditure	Revenue	Profit	Loss
		£ s. d.	£ s. d.	£ s. d.	
Plant Canes	11-15	17 9 6	20 11 2	3 1 8	....
1st Ratoons	6-10	4 19 6	16 2 0	11 2 6	....
2nd Ratoons	1- 5	4 4 4	12 9 5	8 5 1	....
Total	....	26 13 4	49 2 7	22 9 3	....
Sweet Potatoes	23-27	5 5 11	8 5 0	2 19 1	....
Provisions	22	1 10 9	2 7 9½	17 0½	....
Vegetables	21	5 9 6	5 13 6	4 0	....

WORK IN CONNECTION WITH THE SUGAR CANE CROP.

Field Statistics.

Information has been collected by means of a questionnaire sent to all estates with respect to the acreages under the different varieties planted for the 1940 crop, the manurial treatment of the fields and the methods of cultivation.

Returns have been received with respect to 2,731½ acres which covers practically the whole estate plant cane acreage.

As regards varieties the following Tables show:—

(I) The actual and percentage plant cane acreage under different varieties with respect to the 1940 crop.

(II) The relative areas planted under the more widely grown varieties for the seasons 1934—1940 inclusive.

1940 CROP

Plant Canes for 1940. Variety.	Acreage under different Varieties.	
	Acres.	% Reported Acreage.
Ba.11569	1,311	48.1
B.2935	729½	26.7
B.H.10.12	284	10.4
P.O.J.2878	166	6.1
Mixed	97½	3.6
B.726	65½	2.4
P.147 (B.4507)	24	0.8
Co.213	21½	0.7
B.3439	17	0.6
B.6308	7	0.3
B.3127	3	0.1
C.119	3	0.1
S.C.12.4	1½	0.05
B.3013	1	0.05

RELATIVE AREAS OF PLANT CANE UNDER CHIEF VARIETIES 1934—1940.

Year	Ba.11569	B.2935	B.H.10.12	P.O.J. 2878	B.726	B.147 (B.4507)	B.3439
1934	14.0	Nil	37.2	9.3	Nil	26.0	Nil
1935	21.5	Nil	43.6	10.4	0.9	9.9	Nil
1936	23.0	0.8	35.7	20.2	1.3	8.6	Nil
1937	33.0	9.1	24.6	6.5	3.1	11.9	Nil
1938	36.2	13.8	20.7	4.1	2.5	13.3	Nil
1939	38.3	24.8	17.6	6.1	3.5	1.9	0.02
1940	48.1	26.7	10.4	6.1	2.4	0.8	0.60

The decrease in the area under B.H.10.12 has continued during the season under review. This variety has been replaced chiefly by Ba.11569 which is definitely superior to B.H.10.12 on most soils in Antigua under ordinary weather conditions and is even more so during abnormally dry years. The area under B.2935 has continued to increase but more slowly than in earlier years. The limitations of this variety with respect to soil type are discussed in the section on varietal experiments.

B.147 (B.4507) which was once regarded as the standard variety for the drier soils of the Fitches suite has now almost gone out of cultivation. It is definitely inferior to B.2935 and Ba.11569 even on those soils to which it is best suited.

P.O.J.2878 continues to be cultivated on certain poorly drained alluvial soils in the wetter districts where its rapid germination makes it a useful variety on grassy fields.

B.3439 which made its appearance in fields planted for the 1939 crop is likely to become one of the standard varieties and it is known that there will be a large increase in the area under this cane in fields planted for the 1941 crop.

The following Tables show respectively the method of cultivation of the fields prepared for the 1937, 1938, 1939 and 1940 crops and the manurial treatment.

METHOD OF CULTIVATION.

	Gyrotiller		Tractor		Cattle plough	Hand culti- vation	Total
	Flat	Banked	Flat	Banked			
For 1937 Acres	543.25	262.0	282.25	90.0	1,793.5	....	2,791.0
% of Area ...	18.3	8.8	9.5	3.0	60.4	....	100
For 1938 Acres	228.25	105.5	244.0	49.5	1,649.0	....	2,276.25
% of Area	10.2	4.6	10.7	2.2	72.5	....	100
For 1939 Acres	267.25	210.75	83.0	81.0	1,796.5	....	2,438.50
% of Area ...	10.9	8.6	3.4	3.3	73.8	....	100
For 1940 Acres	561.75	....	222.25	191.5	1,747.5	8.5	2,731.5
% of Area	20.5	....	8.1	7.0	64.0	0.4	100

MANURIAL TREATMENT.

	Pen Manure	Pen Manure and in- organics	Filter Press Mud	Filter Press Mud and in- organics	Sheep Manure	Sheep Manure and in- organics	Inor- ganics only	Ashes	No Manure	Total
For 1937 Acres	2,140.80	...	266.5	...	111.25	...	48.0	...	399.25	2,971.0
% of Area ...	72.10	...	9.0	...	3.8	...	1.6	...	13.5	100.0
For 1938 Acres	1,038.75	364.0	104.25	73.5	110.25	...	234.75	9.0	341.75	2,276.25
% of Area ...	45.70	16.0	4.6	3.2	4.8	...	10.3	0.4	15.0	100.0
For 1939 Acres	941.50	624.75	77.50	122.5	19.0	85.5	372.5	...	195.25	2,438.5
% of Area ...	38.60	25.7	3.2	5.0	0.8	...	15.2	...	8.0	100.0
For 1940 Acres	835.75	943.5	49.25	174.0	...	...	540.5	...	188.5	2,731.5
% of Area ...	30.5	34.7	1.8	6.3	...	3.5	19.8	...	6.9	100.0

The increase in the area receiving inorganic fertilizers has continued. For 1937 only 1.6% of the plant cane area received inorganics. For 1938 29.50%, for 1939 49.4% and for 1940 60.8% of the total area received inorganic fertilizers either alone or together with pen manure, sheep manure or filter press mud.

There has been a further small reduction in the area receiving no manure of any kind.

The following figures showing the imports of inorganic fertilizers indicate the very considerable increase in their use in recent years.

Year				Value of Fertilizer Imports.
1934	....	....	....	£2,388
1935	....	....	....	£2,069
1936	....	....	....	£2,748
1937	....	....	....	£3,962
1938	....	....	....	£4,449
1939	....	....	....	£4,787

Figures for the quantities of the different fertilizers imported are not available prior to 1936. The following Table gives the figures for the years 1936—1939 inclusive.

				1936 Tons	1937 Tons	1938 Tons	1939 Tons
Sulphate of Ammonia	....	....	....	817.0	376.0	231	170
Niciphos	....	....	....	25.0	75.5	180	331
Ammophos	....	....	....	....	....	5	....
Superphosphate	....	....	....	122.0	137.0	45	....
Muriate or Sulphate of Potash	....	....	....	10.5	5.0	5	....
Complete Inorganic	....	....	....	....	5.0	....	....
Miscellaneous	....	....	....	....	....	£40 Value	....

SUGAR CANE EXPERIMENTS.

The experiments reported in this Section form portion of a comprehensive series of experiments conducted under the auspices of the Antigua Sugar Cane Investigation Committee and under the direction of Mr. P. E. Turner, Adviser in Sugar Cane Experiments to the Commissioner of Agriculture.

Originally the experiments on the Gunthorpe, Tudway and Codrington Estates and on Delaps were under the control of Mr. C. F. Charter, Agronomist to the Gunthorpe Estates, while the remaining experiments were under the control of the Agricultural Department. Mr. Charter, however, left Antigua during 1937 and those experiments planted by him before that date were reaped under supervision by the Agricultural Department.

A summary of the results of certain of these latter experiments is included in this section, but details as to sites, layout of experiments and yield data are given in Appendix II only with respect to those experiments entirely under the control of the Department.

The thanks of the Agricultural Superintendent are due to Mr. Turner for soil analyses, for statistical analysis of the results and for general advice and assistance in the preparation of this Report and to the Antigua Sugar Factory for analysis of juices from the Plant Cane varietal experiments.

VARIETAL EXPERIMENTS.

Four new varieties B.3013, B.3124, B.3127 and B.3439 were included in the plant cane experiments reaped during 1939 on Fitches clay in No. 23 Cassada Garden and on Gunthorpe clay in No. 8 Cassada Garden.

B.3439 has done particularly well at both stations. It has headed the list with respect to yields both of canes and of sugar on the Gunthorpe clay, the figures being 35.06 tons per acre and 5.11 tons per acre respectively.

On the Fitches clay soil this variety yielded 39.58 tons cane per acre but was outyielded significantly by B.2935 (47.59 tons per acre) and Ba.11569 (45.47 tons cane per acre), B.3439 however again headed the list with respect to sugar production with 5.69 tons per acre.

B.3439 is a cross between Ba.11569 and a Queensland variety Q.813. It germinates well and makes rapid early growth covering the land at an early

stage. It gives a heavy fall of trash and is resistant to drought. It possesses excellent juice qualities. Under Antigua conditions it arrows slightly.

This cane is easily the most promising of the new seedlings; the other three, however, are being given with B.3439 a more extended trial on a number of soil types.

B.2935 has again given good results on Fitches clay soils. As already stated this variety has yielded 47.59 tons cane per acre as a Plant Cane at Cassada Garden. It has headed the list as a First Ratoon at Comfort Hall with 22.72 tons cane per acre, and as a second ratoon at Gaynors with 29.09 tons per acre. As a second ratoon at Cassada Garden* it has filled second place with a yield of 20.55 tons cane per acre and at Vernons* as a first ratoon it has filled the second place with 16.82 tons cane per acre.

With respect to the two crops at Comfort Hall and Vernons (Plant Cane and First Ratoons) and to the three crops at Gaynors and Cassada Garden (Plant Cane, First Ratoons and Second ratoons) B.2935 has in each case topped the list or filled the second position.

The following Table shows the station and the total yield of canes over the two or three crops as the case may be both for the leading cane and the variety next in order to it.

Station.	Leading Variety.	Total yield of canes. Tons per acre.	Second Variety.	Total yield of canes. Tons per acre.	Difference.
Comfort Hall	 B.2935	52.46	Ba. 11569	40.17	12.29
Vernons	 Ba. 11569	58.04	B.2935	57.42	0.62
Gaynors	 B.2935	124.92	Ba. 11569	112.08	12.84
Cassada Garden	 B.2935	89.77	Ba. 11569	82.51	7.26

On other soil types B.2935 in most cases has not proved satisfactory. In an experiment on a calcareous Gunthorpe clay at Blakes it has beaten Ba.11569 and B.H.10.12 both as a plant cane and as a first ratoon. B.2935 has also done well over a series of three crops on Tomlinson clay* topping the list as a plant cane but falling to second place as a first ratoon and to sixth and last place as a second ratoon.

On Gunthorpe clay at North Sound,* on Otto clay at La Roches and on Blubber Valley Loam at Jolly Hill it has proved a failure.

These results fully confirm the conclusions recorded in the report for 1938 to the effect that while B.2935 can confidently be recommended for the soils of the Fitches suites, its extension on other soils should be watched with care in view of its failure on poorly drained land.

Ba.11569 has again done well both as a plant cane and as a ratoon in all the experiments in which it was included. This variety is the most suitable of the standard varieties for Gunthorpe, Otto and Tomlinson clays and probably also for Lindsey clays, but there are indications that B.3439 may prove a successful competitor.

The latter variety may also prove very suitable to the Bental and Blubber Valley soils where its rapid germination and spreading early growth may enable it to compete not only with Ba.11569 but also with P.O.J.2878 which is a favourite variety with some growers for wet poorly drained grassy soils.

Results of the 1939 experiments confirm the opinion expressed in the 1938 report to the effect that B.147 (B.4507) should no longer be grown.

B.H.10.12 has proved markedly inferior to Ba.11569 as a plant cane on Gunthorpe clay at Cassada Garden Ba.11569 30.9 tons per acre, B.H.10.12 26.09 tons per acre. It has proved inferior to Ba.11569 as Plant Cane in 1938

* Experiment planted by C. F. Charter.

and first ratoon in 1939 on Gunthorpe clay at Blakes and at North Sound* and as Plant Cane in 1937, first ratoon in 1938 and second ratoon in 1939 on Fitches clay at Gaynors and on Blubber Valley Loam at Jolly Hill. There is little doubt but that higher yields would result from the substitution of Ba.11569 for B.H.10.12 on some of the better soils on which the latter variety is still grown.

B.726 has given much the same yield as B.H.10.12 in experiments in which they have both been included. This cane is not well suited to the climatic conditions ordinarily experienced in Antigua.

Co.213 has been beaten as a first ratoon at Comfort Hall by B.2935 and Ba.11569, and although superior to these varieties as a second ratoon on Tomlinson clay at Tomlinsons it has been beaten by them over the series, plant cane, first ratoon, second ratoon.

MANURIAL AND CULTURAL EXPERIMENTS.

During 1939 experiments have been reaped in which pen manure has been compared with an inorganic fertiliser.

At Jolly Hill on Blubber Valley Loam the gains in yield of plant cane from a complete inorganic manure have exceeded those resulting from pen manure alone.

At Cassada Garden on Gunthorpe clay the gains in yield of plant cane from sulphate of ammonia plus superphosphate have approximated to the gains resulting from pen manure alone, while on Fitches clay at Lavingtons the gains from sulphate of ammonia plus superphosphate have been inferior to those resulting from pen manure of very high quality.

At Greencastle Experiment Station on Bendal clay it has been shown that the residual effect of pen manure applied to the plant canes is greater than the residual effect of a complete inorganic fertiliser. All plots received sulphate of ammonia as first ratoons.

Significant gains in yield of plant cane have resulted from combinations of nitrogen and phosphate both with and without potash on Otto clay at Willis Freemans and from nitrogen with phosphate on Gunthorpe clay at North Sound.

At North Sound on Gunthorpe clay and at La Roches on Otto clay, significant gains in yield have resulted from the application of late dressings of sulphate of ammonia in the presence of Basal superphosphate and in one experiment at North Sound significant and economic gains from early sulphate of ammonia in the presence of basal phosphate have resulted in the absence of late sulphate of ammonia and almost identical gains from late sulphate of ammonia in the absence of an early application.

In three experiments late applications of superphosphate were given in addition to the early basal application. In no case was there a significant response.

At Millars on a Fitches clay an experiment with sulphate of ammonia superphosphate and sulphate of potash applied alone and in various combinations has now been carried to the second ratoon stage. As plant canes and as first ratoons gains from nitrogen have been independent of the presence of phosphate or potash but as second ratoons the gains from nitrogen have been rather greater in the presence of applied phosphate.

A somewhat similar instance of the increased phosphate deficiency with second ratoons has been observed at Fitches Creek* on a Gunthorpe clay. In this experiment the gains from nitrogen both of the plant cane and of the first ratoons have been greater in the presence of applied phosphate while in the case of the second ratoons gains from nitrogen were almost entirely dependent on the presence of phosphate.

At Belvidere considerable gains in yield of first ratoons (6.83 tons per acre) have resulted from the application of $1\frac{1}{2}$ cwt. sulphate of ammonia to the ratoons in the presence of phosphate and potash. There has also been a small residual effect from late sulphate of ammonia applied to the plant cane crop.

* Experiment planted by C. F. Charter.

Significant gains in yield of first ratoons have been obtained on Otto clay at Ottos from applications of sulphate of potash in the presence of basal sulphate of ammonia. A similar result was observed with the plant cane crop in 1938. The increases in yield resulting from applied phosphate in the plant cane crop and from residual phosphate in the ratoons cannot be shown to be statistically significant, but early applications of phosphate appear to be more effective than late.

In an experiment on Fitches clay at Langfords phosphate and potash in the presence of basal nitrogen gave both as plant canes and as ratoons small increases in yield which could not be established as statistically significant.

In general the conclusions set forth in the report for the year 1938 have been confirmed. These conclusions may be summarised as follows. Plant Canes will normally respond to early applications of pen manure, filter press mud and inorganic mixtures containing Nitrogen and phosphate. Potash appears to be beneficial on certain soils but is less generally required than nitrogen and phosphate.

The beneficial effects of pen manure and of filter press mud persist in the ratoon crops.

Ratoons respond to applications of inorganic fertilizers, especially to Sulphate of Ammonia. On many soils, however, this response to nitrogen is greater in the presence of phosphate. Occasionally Potash is beneficial.

WORK IN CONNECTION WITH THE COTTON CROP.

Seed Selection. The method followed in recent years of establishing seed fields on Thibou's Estate with pedigree seed obtained from the Montserrat Cotton Breeding Station was again adopted in 1939.

By this system a fresh supply of pedigree seed is obtained annually for multiplication at Thibou's for use as planting material for the island's crop in the succeeding year. Ginning of the cotton from the multiplication fields is carried out under supervision of the Agricultural Department which also arranges for suitable storage and for periodical germination tests.

Pink Boll Worm Control. The 1939 Close Season extended from May 1st to August 15th inclusive. Unusually dry weather throughout this period, however, rendered conditions favourable for the carry over of resting stage larvae in fallen bolls in fields and it seemed probable that pink boll worm damage would be greater than had been the case with the 1938—1939 crop.

The campaign against wild cotton was continued during 1939 and there definitely has been an improvement in the situation: the chief difficulty now experienced in pink boll worm control apart from climatic conditions such as drought during the close season is the ever increasing number of offences against the close season law and the resulting trouble in enforcing destruction of cultivated cotton plots at the proper time.

The 1939 drought continued unbroken in some districts until the beginning of October so that the planting season which should have closed at the end of September had to be extended for a further period of one month.

Cotton Varietal Experiments. The varietal experiment at Crosbys was reaped in 1939. Conditions were unfavourable and yields which were very small were as follows:

St. Vincent	{ V.135 ....	....	....	478 lb. seed	cotton per acre.
	{ BD ....	....	....	372 "	" " " "
	{ NN ....	....	....	363 "	" " " "
Nevis	....	....	....	344 "	" " " "
Barbados	....	....	....	325 "	" " " "
Montserrat	....	....	....	297 "	" " " "

V.135 has given a significantly higher yield than any other variety and it is suggested that this may be due to the adverse conditions which prevented the development of any early crop and which favoured as a late crop this variety which has been selected to give a heavy top crop.

This trial while indicating the varietal reaction to adverse conditions cannot be taken as indicating the representative behaviour of the varieties under normal conditions.

An experiment with the varieties, V.135 Barbados and Montserrat, has been planted at Thibous for the 1940 crop. The lay out is four three-by-three Latin Squares which should afford a comparison with a high degree of accuracy.

The thanks of the Agricultural Superintendent are due to Mr. J. B. Hutchinson, Cotton Adviser to the Commissioner of Agriculture for advice as to the lay out of the experiment at Crosbys and for analysis and interpretation of the results.

LAND SETTLEMENT.

A detailed account of the progress of the various land settlements during the year under review is contained in Appendix III.

The following Table shows the quantity and the value of the cane crops from the settlements at Greencastle Matthews, Jonas's and the Folly for the period 1932—1939 inclusive.

Year.	1932.	1933.	1934.	1935.	1936.	1937.	1938.	1939.
Cane tons	405	1,924	2,907	2,716	5,127	6,960	5,390	4,921
Gross Value £	258	1,342	2,044	1,878	3,544	5,242	3,867	3,726
Marketing Charges £	1	9	25	39	79	102	87	78
Deductions* £	84	350	471	488	616	673	761	783
Cash paid allottees £	173	983	1,548	1,351	2,849	4,467	3,019	2,865

AGRICULTURAL EDUCATION.

Monthly lectures to teachers in the Primary schools were given by the Agricultural Superintendent.

CORRESPONDENCE.

During the year 165 Minute papers were dealt with, 258 letters were received and 434 despatched.

AGRICULTURAL SHOW.

An Agricultural, Horticultural and Industrial Exhibition was held in January 1939 under the auspices of the Antigua Agricultural and Commercial Society.

OFFICIAL VISITS.

Visits were paid to the Experiment Station by Mr. C. C. Skeete, B.A., Acting Commissioner of Agriculture, Mr. P. E. Turner, M.Sc., F.I.C., Adviser in Sugar Cane Experiments to the Commissioner of Agriculture, Professor C. Y. Shephard, Ph.D., B.Sc., Professor of Economics at the Imperial College of Tropical Agriculture and Mr. J. B. Hutchinson, M.A., Cotton Adviser to the Commissioner of Agriculture.

* Deductions for loans, interest on loans and annual instalments of purchase price.

SECTION III. FINANCIAL STATEMENT AND STAFF OF THE DEPARTMENT.

FINANCIAL STATEMENT.

HEAD VII.—Agriculture.				Expenditure			Revenue		
				£	s.	d.	£	s.	d.
Salaries				1,216	7	1			
House Allowance				40	0	0			
Transport Allowances				206	2	1			
Greencastle and other Experimental Work				352	19	4			
Sugar Cane Experiments				99	19	11			
Planting and Maintaining Trees				24	17	3			
Fumigation of Plants				2	17	1			
Printing Reports and Contingencies				18	5	9			
Destruction of Wild Cotton and Okra Plants				44	1	10			
Temporary Cotton Inspectors....				84	0	0			
Contribution to Central Cane Breeding Station				212	10	0			
Agricultural Exhibition				113	12	10			
Upkeep, Botanic Station				109	16	10	2,525	10	10
Revenue of Experiment Station				—			190	7	9½
Profit on Sale of Onion and Vegetable Seeds							7	10	7
HEAD XV.—Government Undertakings				—					
(2) Land Settlement									
Land Officer's Department									
Salary and Travelling				61	17	6	61	17	6
Agricultural Development									
Supervision				42	0	0			
Planting Material				32	12	2			
Drains				21	6	5			
Roads				14	12	7			
Miscellaneous				1	5	6	111	16	8
Payment for Land and Houses collected through the Agricultural Department				—			432	5	10
Advance Accounts.									
Vegetable and Onion Seed Account				29	8	9			
Fertilizer Account				146	16	4			
Cultivation Account				335	13	0	511	18	1
Sale of Vegetable and Onion Seed £36. 19. 4 less £7. 10. 7 transferred to Revenue				—			29	8	9
Fertilizer Account—Transfer....				—			137	11	8
Cultivation Account—Cash				—			1	0	10
Cultivation Account—Transfer				—			200	3	0½
Total Expenditure & Receipts				—			3,211	3	1
Deposit Account Sale of Crops									
Peasant Cane Payments				2,865	3	1			
Reaping Costs				79	9	1			
Transfer to Revenue—Produce of Experiment Station				190	7	9½			
Transfer to Revenue—Payments for Land and Houses				432	5	10			
Transfer to Fertilizer Account..				137	11	8			
Transfer to Cultivation Account				200	3	0½			
Transfer to Revenue—Interest on year's working				11	18	5			
Balance on year's working left in Account				12	8½		3,917	11	7½
Receipts from sale of canes and other produce				—			3,917	11	7½

STAFF OF THE DEPARTMENT.

Agricultural Superintendent	....	F. H. S. Warneford, M.A., B.Sc., A.I.C.
Agricultural Assistant	....	Vacant.
Junior Assistant	....	V. G. Pereira.
Assistant Clerk (Office)	....	S. L. Henry, January 1st—July 23rd.
		K. A. M. Potter, July 24th—December 31st.
Field Assistant (Assistant Clerk)	....	C. K. G. Vieira.
Cotton Inspector	....	S. H. Abbott, January 1st—July 24th.
		N. H. Gonsalves, July 25th—December 31st.
Foreman Experiment Station	....	R. E. M. Whyte.

SECTION IV.

SUMMARY OF LEGISLATION AFFECTING AGRICULTURE.

The summary included in the annual report for 1938 remains unchanged save for the following particulars.

1. *Under Protection.* Add the Forestry Ordinance No. 8 of 1939 which makes provision for the appointment of a Forestry Board for the declaration of Forest Reserves and for reforestation of denuded areas.

Rules made under this ordinance are covered by S. R. & O. No. 18 of 1939.

2. The Exportation of Fruit Ordinance was brought into operation on 1/11/39.

3. Under Legislation affecting labour. (a) The Workmen's Compensation act was amended by Leeward Islands Act No. 8 of 1939 to include agricultural labourers.

(b) The Minimum Wage Act, add under Index of Legislation Leeward Islands Act No. 21 of 1937.

Add (c) The Employment of Women, Young Persons and Children Act, Leeward Islands Act No. 5 of 1938. This Act makes provision for prohibition and restriction of the employment of women, young persons and children in industrial undertakings.

Add (d) The Trade Disputes Act. This act provides means for the settlement of trade disputes including the fixing of wages and other relative matters by Arbitration Tribunals.

APPENDIX I.

POSSIBILITY OF INCREASED FOOD PRODUCTION.

The annual report for 1938 indicated briefly the position with respect to local production of the chief foodstuffs and outlined briefly certain lines of work which were contemplated with a view to increasing production.

The outbreak of war in September made it imperative that steps be taken to render Antigua more independent of external sources of food—all the more so since the area normally under food crops had been greatly reduced on account of the drought which had persisted throughout the year.

A rough census of the food crops actually growing at the end of August showed that the area under these crops amounted to about 344 acres only as compared with over 1,000 acres in normal years. Arrangements were at once made for the importation of planting material and for the establishment of nurseries for distribution of sweet potato cuttings and of tomato and onion seedlings as soon as weather conditions made planting possible.

A Committee was appointed to organise food production on estates and in view of the unemployment arising from the severe drought loans were made for relief work on food crops both to estates and to peasant proprietors. By the end of the year 308 acres of corn had been planted on estates and arrangements had been made for planting a further 197 acres. Estates had also planted 42 acres sweet potatoes, 8 acres peas and beans and 10 acres tomatoes and had arranged for the planting of additional areas of 19 acres, 5 acres and 4 acres respectively.

No precise figures are available as to the areas planted by peasants but it is known that they were at least as large as the estate areas and in the case of sweet potatoes greatly in excess of the estate areas.

The building to house the new Government cornmeal factory was completed and the machinery was installed in time for operations to start early in 1940.

A small fish curing industry was started as one of the activities of the Agricultural Development Department and has been producing a very satisfactory type of salted fish which in time should go a long way towards replacing the imported article.

The following Table shows the more important foodstuffs imported into Antigua during the period 1934—1939 inclusive. The figures for the years 1934—1938 have been obtained from the Leeward Islands Blue Book and for 1939 have been supplied by the Treasury.

Article.	1934.		1935.		1936.		1937.		1938.		1939.	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
		₹		₹		₹		₹		₹		₹
Biscuits, Bread & Cakes lb.	178,980	1,917	157,976	1,720	196,259	2,746	194,972	3,312	180,672	2,929	122,127 lb	1,849
Butter & butter substitute lb.	103,996	3,733	85,151	2,882	88,969	3,511	100,801	3,923	111,511	5,169	114,064 lb	4,517
Fish lb.	884,136	6,367	556,880	6,163	742,107	6,601	802,269	7,608	897,712	9,034	815,237 lb	7,451
Corn lb.	252,186	1,101	196,994	1,216	148,088	664	157,589	710	81,850	350	40,334 lb	139
Cornmeal bags.	11,766	9,955	11,035	11,218	8,575	9,501	8,069	10,777	11,174	10,332	11,641 lb	8,492
Flour bags.	16,353	16,218	17,162	19,159	19,640	18,334	16,075	23,087	16,537	19,751	19,595 lb	11,938
Lard & lard substitute lb.	117,900	1,936	87,877	2,184	121,444	2,394	137,910	2,818	141,901	2,794	149,331 lb	2,776
Meat lb.	65,313	1,817	47,949	1,558	137,037	3,829	171,948	5,268	79,553	1,867	162,355 lb	3,620
Edible Oils	...	1,579	...	2,418	...	2,866	...	4,369	...	3,771	...	3,579
Rice lb.	1,307,166	6,451	1,520,642	7,011	1,694,279	6,937	2,222,579	9,899	2,017,752	9,291	2,350,027 lb	9,384

APPENDIX II.

SUGAR CANE EXPERIMENTS.

VARIETAL EXPERIMENTS.

A. EXPERIMENTS WITH PLANT CANES.

Varietal Trial—Cassada Garden No. 8.
 Soil Type—Calcareous Gunthorpe clay.
 Manurial Treatment—Pen manure 15 tons per acre buried under the banks.
 Niciphos $1\frac{1}{2}$ cwt. per acre December 1937.
 Planted 17/11/37.
 Reaped 13/2/39.
 Rainfall:
 November and December 1937 7.90 ins.
 1938 40.69 „
 January—February 12th 1939 1.41 „
 50.00 „

Layout—One 6 x 6 Latin Square. Plot Area $1/24.2$ acres.

Variety	Yield of cane Tons per acre	% Sucrose in cane	Tons cane per Ton Sugar	Tons Sugar per acre
B.3439	35.06	15.55	6.86	5.11
Ba.11569	30.90	13.98	7.68	4.02
B.3127	28.30	14.73	7.199	3.93
B.3013	27.92	16.78	6.26	4.46
B.726	26.34	15.84	6.64	3.97
B.H.10.12	26.09	16.48	6.516	4.01

Differences in yield of cane exceeding 1.58 and 2.16 tons per acre might be due to chance less than once in 20 and once in 100 times respectively.

B.3439 is the outstanding variety giving the largest yields per acre both of cane and of sugar.

Varietal Trial—Cassada Garden No. 23.
 Soil Type—Fitches clay.
 Manurial Treatment 2 cwt. Niciphos per acre December 1937.
 Planted 18/11/37.
 Reaped 20/2/39.

Rainfall:
 November—December 1937 8.89 ins.
 1938 48.39 „
 January—February 20th 1939 1.58 „

58.86 „

Layout—One 6 x 6 Latin Square. Plot area $1/26.8$ acres.

Variety	Yield of cane Tons per acre	% Sucrose in cane	Tons cane per Ton Sugar	Tons Sugar per acre
B.2935	47.59	11.93	9.11	5.22
Ba.11569	45.47	12.21	8.90	5.11
B.3124	41.83	13.96	7.53	5.55
B.3127	40.64	13.10	8.18	4.97
B.3439	39.58	15.27	6.95	5.69
B.726	38.21	14.77	7.14	5.35

Differences in yield of cane exceeding 3.21 and 4.38 tons per acre might be due to chance less than once in 20 and once in 100 times respectively.

B.2935 is significantly better than all other varieties save Ba.11569 in yield of cane per acre but the juice is markedly inferior to that of certain other varieties especially B.3439 which takes first place with respect to tons sugar per acre

B. EXPERIMENTS WITH RATOONS.

Varietal Trial Greencastle Experiment Station.

Soil Type—Bendal clay.

Manurial Treatment. As Plant Cane 7 tons pen manure per acre under the banks and $1\frac{1}{2}$ cwt. Sulphate of Ammonia June 1937.

As First Ratoons 2 cwt Sulphate of Ammonia 30/3/38.

Planted 25 and 27/11/36.

Reaped as Plant Cane 6/3/38.

Reaped as First Ratoon 22/3/39.

Rainfall as Plant Canes 69.47 ins.

Rainfall as First Ratoons 61.45 ins.

Layout—12 Randomised Blocks. Plot Area 1/53.8 Acres.

Variety	Yield of Canes		Tons per Acre	
	Plant Canes	1st Ratoons	Total	Difference
F.C.916	26.27	24.29	50.56	....
M.P.R.42	26.79	22.92	49.71	0.85
B.H.10.12	24.98	21.13	46.11	4.45
B.726	24.61	19.94	44.55	6.01

Differences in yield per acre of plant canes exceeding 1.90 tons and 2.56 tons might be due to chance less than once in 20 times and once in 100 times respectively. The corresponding figures for ratoon yields are 2.08 and 2.81.

Varietal Trial—Comfort Hall No. 9.

Soil Type—Fitches clay.

Manurial Treatment. As plant cane Nil.

As 1st Ratoons 2 cwt Niciphos per Acre 12/7/39.

Planted 13/11/36.

Reaped as Plant Cane 10/2/38.

Reaped as First Ratoon 2/3/39.

Rainfall as Plant Canes 50.75 ins.

Rainfall as First Ratoons 38.00 ins.

Layout—Two 5 x 5 Latin Squares. Plot Area 1/32.3 Acres.

Variety	Yield of Canes		Tons per Acre	
	Plant Canes	1st Ratoons	Total	Difference
B.2935	29.74	22.72	52.46	....
Ba.11569	22.63	17.54	40.17	12.29
P.O.J.2727	20.40	16.79	37.19	15.27
Co.213	20.20	14.00	34.20	18.26
B.147 (B.4507)	16.87	13.35	30.22	22.24

Differences in yield of plant canes exceeding 2.64 tons per acre, differences in yield of 1st ratoons exceeding 1.90 tons per acre and differences in total yield exceeding 4.08 tons per acre might be due to chance less than once in 20 times. Differences in yield of plant canes exceeding 3.56 tons per acre, differences in yield of 1st. ratoons exceeding 2.57 tons per acre and differences in total yield exceeding 5.50 tons per acre might be due to chance less than once in 100 times.

B.2935 is the outstanding variety.

Varietal Trial. Blakes 11.E.

Soil Type slightly calcareous Gunthorpe clay.

Manurial Treatment. As Plant Canes Nil.

As First Ratoons 2 cwt Niciphos per Acre 19/7/38.

Planted 18/12/36.

Reaped as Plant Cane 3/3/38.

Reaped as First Ratoons 8/3/39.

Rainfall as Plant Canes 74.47 ins.

Rainfall as First Ratoons 44.49 ins.

Layout—Four 3 x 3 Latin Squares. Plot Area 1/32.8 Acres.

Variety.	Yield of Canes.		Tons per Acre.	
	Plant Canes.	1st Ratoons.	Total.	Difference.
B.2935	27.55	16.42	43.97	—
Ba. 11569	25.87	16.40	42.27	1.70
B.H.10.12	21.81	14.29	36.10	7.87

Differences in yield of plant canes exceeding 1.61 tons per acre, differences in yield of first ratoons exceeding 1.31 tons per acre and differences in total yield exceeding 3.17 tons per acre might be due to chance less than once in 20 times.

Differences in yield of plant canes exceeding 2.35 tons per acre, differences in yield of first ratoons exceeding 1.82 tons per acre and differences in total yield exceeding 4.41 tons per acre might be due to chance less than once in 100 times.

Varietal Trial—La Roches No. 3.

Soil Type—Otto clay.

Manurial Treatment. As Plant Cane Nil.

As First Ratoons 2 cwt Sulphate of Ammonia per Acre 16/6/38.

Planted 25/11/36.

Reaped as Plant Canes 25/2/38.

Reaped as First Ratoons 7/3/39.

Rainfall as Plant Canes 59.49 ins.

Rainfall as First Ratoons 39.97 ins.

Layout—Four 3 x 3 Latin Squares. Plot Area 1/23.1 Acres.

Variety	Yield of Canes		Tons per Acre	
	Plant Canes	1st Ratoons	Total	Difference
Ba.11569	28.44	20.33	48.77	....
B.H.10.12	25.98	17.57	43.55	5.22
B.2935	22.20	9.97	32.17	16.60

Differences in yield of plant canes exceeding 1.93 tons per acre differences in yield of first ratoons exceeding 1.57 tons per acre and differences in total yield exceeding 2.92 tons per acre might be due to chance less than once in 20 times.

Differences in yield of plant canes exceeding 2.98 tons per acre, differences in yield of first ratoons exceeding 2.68 tons per acre and differences in total yield exceeding 4.05 tons per acre might be due to chance less than once in 100 times.

Ba.11569 is the outstanding variety. B.2935 has failed completely.

Varietal Trial—Gaynors Elms No. 5.

Soil Type—Fitches clay.

Manurial Treatment. Plant Canes 25 tons pen manure.

First Ratoons 2 cwt Sulphate of Ammonia per acre
5/10/37.

Second Ratoons 1½ cwt Niciphos per acre 6/4/38.

Planted 16/11/35.

Reaped as Plant Canes 17/2/37.

Reaped as First Ratoons 13/4/38.

Reaped as Second Ratoons 27/4/39.

Rainfall as Plant Canes 75.33 ins.

Rainfall as First Ratoons 37.33 ins.

Rainfall as Second Ratoons 43.09 ins.

Layout—One 6 x 6 Latin Square. Plot Size 1/30 Acre.

Variety.	Yield of Canes. Tons per Acre.				
	Plant Canes.	1st Ratoons	2nd Ratoons	Total.	Difference.
B. 2935	64.52	31.31	29.09	124.92	—
Ba. 11569	56.06	29.39	26.63	112.08	12.84
P.O.J. 2878	56.67	27.85	25.32	109.84	15.08
B.H. 10.12	55.35	27.21	24.57	107.13	17.79
B. 726	53.71	26.62	26.11	106.44	18.48
B. 147 (B.4507)	42.16	25.72	21.41	89.29	35.63

Differences in yield of canes exceeding 5.72, 2.02 and 2.27 tons per acre in the case of plant canes: first ratoons and second ratoons respectively might be due to chance less than once in 20 times.

Similar differences exceeding 7.80 tons for plant canes, 2.76 tons for first ratoons and 3.10 tons for second ratoons might be due to chance less than once in 100 times.

B.2935 is the outstanding variety.

Varietal Trial—Jolly Hill Spring Piece.

Soil Type—Blubber Valley Sandy Loam.

Manurial Treatment. Plant Cane Nil.

First Ratoons 2 cwt sulphate of ammonia per acre.
Second Ratoons 2 cwt sulphate of ammonia per acre.

Planted 9/11/35.

Reaped as Plant Cane 25/4/37.

Reaped as First Ratoons 2/5/38.

Reaped as Second Ratoons 18/3/39.

Rainfall as Plant Canes 86.53 ins.

Rainfall as First Ratoons 40.00 ins.

Rainfall as Second Ratoons 53.03 ins.

Layout—Two 5 x 5 Latin Squares. Plot Area 1/29 Acre.

Variety.	Yield of Canes. Tons per Acre.				
	Plant Canes.	1st Ratoons	2nd Ratoons	Total.	Difference.
P.O.J. 2878	43.44	24.01	22.36	89.81	—
Ba. 11569	41.50	24.10	17.19	82.79	7.02
B.H.10.12	40.17	19.53	16.99	76.69	13.12
B. 726	40.56	17.15	15.22	72.93	16.88
B. 2935	43.29	15.45	8.18	66.92	22.89

Differences in yield of canes exceeding 3.51, 3.22 and 3.15 tons per acre in the case of plant canes first ratoons and second ratoons respectively might be due to chance less than once in 20 times.

Similar differences exceeding 4.74 tons for plant canes, 4.34 tons for first ratoons and 4.26 tons for second ratoons might be due to chance less than once in 100 times.

MANURIAL EXPERIMENTS.

A. EXPERIMENTS INCLUDING ORGANIC MANURES.

1. *Permanent Manurial Experiment.*

Pen Manure V Complete Inorganic.

Greencastle Experiment Station.

Soil Type—Bendal Clay.

Variety B.H.10.12.

Planted 6/1/37.

Reaped as Plant Cane 4/4/38.

Reaped as 1st Ratoons 21/3/39.

Rainfall as Plant Cane (15 months) 43 ins.

Rainfall as 1st Ratoons (11½ months) 60 ins.

Layout—One 4' x 4 Latin Square with two replicates in each row and in each column.

Plot Area 1/48.5 Acres.

Manurial Treatment per acre. As Plant Canes	Yields of cane tons per Acre			
	1st Ratoons	Plant Canes	1st Ratoons	Total
15 tons pen manure	1½ cwt. S.A.	43.30	45.97	89.27
{ 2 cwt. S.A., 2 cwt. Super,	1½ cwt. S.A.	42.38	42.58	84.96
(2 cwt. Sulphate of Potash				
Difference		0.92	3.39	4.31

The difference in yield of first ratoons in favour of pen manure might be due to chance less than once in 100 times.

II. Experiment with Sulphate of Ammonia, Superphosphate, and Sulphate of Potash alone and in various combinations both in the presence and absence of pen manure.

Estate—Jolly Hill. No. 1 E.

Soil type—Blubber Valley Series. Variety B.H.10.12.

Planted 2/12/37.

Reaped as Plant Cane 15/3/39.

Rainfall (15½ months) 61 ins.

Layout—Six randomised blocks with pen manured half plots.

Half Plot Area 1/38.2 Acres.

Manurial Treatment per acre.	Yield of canes, tons per acre.	
	No pen manure.	15 tons pen manure.
Nil	22.94	25.19
2 cwt. S.A. 3/12/37, 2 cwt. S.A. 18/5/38	25.34	25.45
2 cwt. Super 3/12/37	25.52	27.08
2 cwt. K ₂ SO ₄ 3/12/37	23.98	26.30
2 cwt. Super and 2 cwt. S.A. 3/12/37, 2 cwt. S.A. 18/5/38	26.43	27.66
2 cwt. K ₂ SO ₄ and 2 cwt. S.A. 3/12/37, 2 cwt. S.A. 18/5/38	27.01	27.63
2 cwt. Super, 2 cwt. K ₂ SO ₄	25.28	27.99
2 cwt. Super, 2 cwt. K ₂ SO ₄ and 2 cwt. S.A. 3/12/37, 2 cwt. S.A. 18/5/38	27.01	27.78
Means of plots with and without pen manure	25.44	26.88
Average effects of inorganic nitrogen		
No Nitrogen	24.43	26.64
4 cwt. Nitrogen	26.45	27.13
Average effect of Superphosphate		
No Super	24.82	26.14
2 cwt. Super	26.06	27.63

The average gains from pen manure and from inorganic nitrogen might be due to chance less than once in 100 and once in 20 times respectively.

The gain from pen manure is significantly smaller in the presence of inorganic nitrogen and conversely.

The average gain in yield from phosphate might be due to chance less than once in 100 times.

III. Experiments with Sulphate of Ammonia and Superphosphate alone and in various combinations with and without pen manure.

Estate—Lavingtons No. 5.

Soil Type—Fitches clay. Variety Ba. 11569.

Planted 17/11/39.

Reaped as Plant Canes 6/2/39.

Rainfall (14½ months) 54 ins.

Layout—Two 6 x 6 Latin Squares with pen manure half plots.

Half Plot Area 1/52 Acres.

Manurial Treatment per acre.	Yield of canes, tons per acre.	
	No pen manure.	12½ tons pen manure. 22/12/38
Nil	31.22	40.90
1 cwt. Sulphate of Ammonia 21/12/37, 1 cwt. S.A. 17/6/38	32.64	42.12
2 cwt. Sulphate of Ammonia 21/12/37, 2 cwt. S.A. 17/6/38	32.71	42.88
2 cwt. Super 21/12/37	31.47	40.62
2 cwt. Super and 1 cwt. S.A. 21/12/37, 1 cwt. S.A. 17/6/38	32.72	42.64
2 cwt. Super and 2 cwt. S.A. 21/12/37, 2 cwt. S.A. 17/6/38	33.17	43.50
Means of Plots with and without pen manure	32.32	42.11
Mean of Plots with no Nitrogen		36.06
Mean of Plots with 2 cwt. S.A.		37.53
Mean of Plots with 4 cwt. S.A.		38.07

The gain in yield of 9.79 tons per acre resulting from treatment with pen manure might be due to chance far less than once in 100 times.

The gains in yield from single and double inorganic nitrogen 1.47 tons and 2.01 tons per acre might be due to chance less than once in 20 times and once in 100 times respectively.

The average gain in yield from Phosphate is not statistically significant.

Estate—Cassada Garden. Field No. 29.

Soil type—Gunthorpe clay. Variety Ba.11569.

Planted 3/11/37.

Reaped as Plant canes 8/2/39.

Rainfall (15¼ months) 50 ins.

Layout—Two 6 x 6 Latin Squares with pen manured half plots.

Half Plot Area 1/31 Acres.

Manurial Treatment per acre.	Yield of canes, tons per acre.	
	No pen manure.	15 tons pen manure. 28/9/37
Nil	26.16	30.12
1 cwt. Sulphate of Ammonia 2/12/37, 1 cwt. S.A. 9/6/38	26.67	33.21
2 cwt. Sulphate of Ammonia 2/12/37, 2 cwt. S.A. 9/6/38	27.62	33.65
2 cwt. Super 2/12/37.	26.91	32.15
2 cwt. Super and 1 cwt. S.A. 2/12/37, 1 cwt. S.A. 9/6/38	27.62	33.83
2 cwt. Super and 2 cwt. S.A. 2/12/37, 2 cwt. S.A. 9/6/38	29.29	34.51
Means of Plots with and without pen manure	27.38	32.91
Mean of Plots with no Nitrogen		28.84
Mean of Plots with 2 cwt. S.A.		30.34
Mean of Plots with 4 cwt. S.A.		31.27
Mean of Plots without Phosphate		29.57
Mean of Plots with 2 cwt. Super		30.72

The gain in yield of 5.53 tons per acre resulting from pen manure might be due to chance far less than once in 100 times.

The gains in yield from single and double inorganic nitrogen viz: 1.50 and 2.43 tons per acre might be due to chance less than once in 20 times and once in 100 times respectively.

The gain in yield of 1.15 tons per acre resulting from phosphate might be due to chance less than once in 20 times.

IV. *Kind of Nitrogen and Phosphate with and without Potash.*

Estate—Willis Freemans No. 2.

Soil Type—Gunthorpe clay. Variety Ba.11569.

Planted 1/4/38.

Reaped as Plant Canes 4/3/39.

Rainfall (11 months) 36 ins.

Layout—One 7 x 7 Latin Square with potash half plots.

Half Plot Area 1/36.7 Acres.

Main Manurial Treatments per acre. Applied 16/6/38.	Yield of canes, tons per acre.	
	No Potash.	1 cwt. Muriate of Potash. 15/6/38
Nil	22.31	23.81
1 cwt. Niciphos B.	25.51	26.35
S/A and Super equivalent to 1 cwt. Niciphos B.	25.47	25.39
1 cwt. Niciphos C.	25.01	26.45
S/A and Super equivalent to 1 cwt. Niciphos C.	25.40	26.56
1 cwt. Niciphos A.	26.01	26.73
S/A and Super equivalent to 1 cwt. Niciphos A.	25.00	25.82
Means of plots with and without potash	24.96	25.87
Mean of plots without nitrogen and phosphate		23.06
Mean of plots with nitrogen and phosphate		25.81

The average gain in yield of 0.91 tons per acre resulting from treatment with muriate of potash might be due to chance less than once in 100 times and the average gain in yield of 2.75 tons per acre resulting from nitrogen and phosphate might also be due to chance less than once in 100 times.

There appears to be little to choose between the different grades of Niciphos and between Niciphos and equivalent quantities of sulphate of ammonia and superphosphate.

V. Nitrogen, Phosphate and Potash.

Estate Millars No. 1.

Soil Type—Fitches clay. Variety P.O.J.2878.

Planted 5/11/35.

Reaped as Plant Canes 6/3/37.

Reaped as 1st Ratoons 21/3/38.

Reaped as 2nd Ratoons 5/5/39.

Rainfall as Plant Canes (16 months) 80 ins.

Rainfall as 1st Ratoons (12½ months) 37 ins.

Rainfall as 2nd Ratoons (13½ months) 48 ins.

Layout—One 6 x 6 Latin Square with phosphate half plots.

Half Plot Area 1/35.9 Acres.

Main Manurial Treatment Tons per Acre as Plant Cane	Yield of Cane Tons per Acre as Plant Cane		Main Manurial Treatment Tons per Acre as 1st Ratoons	Yield of Cane Tons per Acre as 1st Ratoons		Main Manurial Treatment Tons per Acre as 2nd Ratoons	Yield of Cane Tons per Acre as 2nd Ratoons	
	No Phosphate	2 cwt. Super.		No Phosphate	2 cwt. Super.		No Phosphate	2 cwt. Super.
Nil	43.46	45.76	Nil	14.31	14.34	Nil	11.15	11.55
K.	44.61	44.95	K.	14.70	15.25	K.	11.60	11.04
N.	47.84	47.42	N.	18.85	19.32	N.	15.76	16.55
NK.	47.40	48.69	NK.	18.75	18.97	NK.	15.66	15.94
N2	50.27	50.55	N.	18.82	19.03	N.	15.48	16.38
N2K.	49.56	50.64	NK.	19.48	19.36	NK.	15.07	16.89
Mean yield of Plots with or without Super. ...	47.19	48.00		17.49	17.71		13.44	13.88
No N.	44.70		No N.	14.61			11.34	
N1.	47.84		N.	19.09			15.98	
N2	50.26							

Both with plant canes and with first and second ratoons the average gains in yield from nitrogen are statistically significant.

The gains in yield of second ratoons from phosphate might be due to chance less than once in 20 times and as second ratoons the gain in yield from nitrogen is greater in the presence than in the absence of phosphate.

VI. *Experiments with Nitrogen and Phosphate.*

Kind of early nitrogen and phosphate with and without late nitrogen.

Estate—Diamond. No. 3.

Soil Type—Fitches clay. Variety Ba 11569.

Planted 18/11/37.

Reaped as Plant Cane 8/2/39.

Rainfall (14¼ months) 59 ins.

Layout—One 7 x 7 Latin Square with late nitrogen half plots.

Half Plot Area 1/32.3 Acres.

Main Manurial Treatments per Acre applied 23/12/37	Yield of Canes Tons per Acre	
	No S.A.	1½ cwt. S.A. per Acre 15/6/38
Nil	29.06	31.63
1 cwt. Niciphos B.	32.05	33.09
S.A. and Super equivalent to 1 cwt. Niciphos B.	29.75	31.90
1 cwt. Niciphos C.	29.69	30.92
S.A. and Super equivalent to 1 cwt. Niciphos C.	28.96	30.80
1 cwt. Niciphos A.	30.71	32.60
S.A. and Super equivalent to 1 cwt. Niciphos A.	31.07	31.53
Means of Plots with and without late Nitrogen	30.18	31.78

The gain of 1.60 tons per acre resulting from the late dressing of nitrogen might be due to chance less than once in 100 times.

There is a small average gain of 0.74 tons per acre resulting from early nitrogen and phosphate but this cannot be established as statistically significant nor can the small apparent superiority of the niciphos manures as compared with equivalent mixtures of S.A. and Super.

Early and late Nitrogen with additional late phosphate—all plots being given basal early phosphate.

Estate—Sandersons No. 18.

Soil Type—Fitches clay. Variety Ba.11569.

Planted 5/11/37.

Reaped as Plant Cane 12/2/38.

Rainfall (15¼ months) 59 ins.

Layout—Six randomised blocks of 9 treatments with late phosphate half-plots.

Half Plots Area 1/43.5 Acres.

Main Manurial Treatments per Acre. Basal Super. 2 cwt. 7/12/37.		Yield of Canes Tons per Acre.	
Early S.A. 7/12/37	Late S.A. 20/6/38	No late phosphate.	1 cwt. Super per acre. 20/6/38.
Nil.	Nil.	29.16	29.95
1 cwt.	Nil.	30.38	31.19
2 cwt.	Nil.	30.61	29.73
Nil.	1 cwt.	31.51	32.90
1 cwt.	1 cwt.	29.68	30.35
2 cwt.	1 cwt.	31.59	32.36
Nil.	2 cwt.	31.40	31.82
1 cwt.	2 cwt.	30.81	30.81
2 cwt.	2 cwt.	33.21	33.45
Means of Plots with and with- out late Super		30.93	31.40

The average gain of 0.47 tons per acre resulting from the late dressing of superphosphate cannot be established as statistically significant, nor can the average gains from the early and late dressings of S.A. The experimental area has shown a high degree of soil variation which may have vitiated the results of the experiment.

Estate—North Sound No. 11.

Soil Type—Gunthorpe clay. Variety Ba.11569.

Planted 13/11/37.

Reaped as Plant Cane 16/2/39.

Rainfall (15 months) 56 ins.

Layout—Six randomised blocks of 9 treatments with late phosphate half plots.

Half Plot Area 1/43.5 Acres.

Main Manurial Treatments per Acre. Basal Super. 2 cwt. 14/12/37.		Yield of Canes Tons per Acre.	
Early S.A. 14/12/37.	Late S.A. 10/6/38.	No late phosphate.	1 cwt. Super per acre. 10/6/38.
Nil.	Nil.	37.80	37.30
1 cwt.	Nil.	42.38	42.94
2 cwt.	Nil.	40.79	42.17
Nil.	1 cwt.	40.96	42.52
1 cwt.	1 cwt.	42.35	40.86
2 cwt.	1 cwt.	42.77	42.85
Nil.	2 cwt.	42.44	42.64
1 cwt.	2 cwt.	41.05	42.45
2 cwt.	2 cwt.	42.33	40.65
Means of Plots with and with- out late Super		41.43	41.60

No gain was derived from the late dressing of superphosphate.

Average gains from the early and late treatments with sulphate of ammonia 1.36 tons per acre and 1.44 tons per acre respectively might be due to chance less than once in 20 times. Early nitrogen gave rise to a gain of 4.52 tons per acre in the absence of late nitrogen while late nitrogen gave rise to a gain of 4.59 tons per acre in the absence of early nitrogen: Little gain resulted from late nitrogen in the presence of early nitrogen and vice versa.

Estate—La Roches No. 2.

Soil Type—Otto clay. Variety Ba.11569.

Planted 26/11/37.

Reaped as Plant Cane 16/2/39.

Rainfall (14 $\frac{3}{4}$ months) 43 ins.

Layout—Six randomised Blocks of 9 treatments with late phosphate half plots.

Half Plots Area 1/34.8 Acres.

Main Manurial Treatments per Acre. Basal Super. 2 cwt. per acre 29/12/37.		Yield of Canes Tons per Acre.	
Early S.A. 29/12/37	Late S.A. 16/6/38	No late phosphate.	1 cwt. Super per acre. 16/6/38.
Nil.	Nil.	29.92	30.10
1 cwt.	Nil.	30.93	30.68
2 cwt.	Nil.	31.14	31.55
Nil.	1 cwt.	30.45	32.64
1 cwt.	1 cwt.	32.09	32.16
2 cwt.	1 cwt.	32.12	31.10
Nil.	2 cwt.	31.10	31.15
1 cwt.	2 cwt.	31.39	32.92
2 cwt.	2 cwt.	30.53	32.97
Means of Plots with and without late Super		31.07	31.70

The average gain of 0.63 tons per acre resulting from the late dressing of superphosphate cannot be established as statistically significant.

The average gain from the early treatment with sulphate of ammonia cannot be established as statistically significant. The average gain from the late treatment with sulphate of ammonia 1.00 tons per acre might be due to chance less than once in 20 times. The average gains from early nitrogen tend to be larger in the absence of late nitrogen and conversely but the inter action cannot be established as statistically significant.

Early Nitrogen and Phosphate with and without additional late Nitrogen.

Estate—North Sound. No. 18 W.

Soil type—Gunthorpe clay Variety Ba.11569.

Planted 23/12/37.

Reaped as Plant Cane 16/3/39.

Rainfall (14 $\frac{3}{4}$ months) 48 ins.

Layout—One 9 x 9 Latin Square with late nitrogen half plots.

Half Plot Area 1/49.7 Acres.

Main Manurial Treatments per Acre 28/12/37	Yield of Canes. Tons per Acre		
	No late S.A.	1½ cwt. late S.A.	Gain from late S.A.
Nil	35.63	36.61	0.98
1 cwt. Super	36.17	37.24	1.07
2 cwt. Super	37.65	39.43	1.78
1 cwt. S.A.	35.55	36.28	0.73
1 cwt. Super + 1 cwt. S.A.	37.64	38.45	0.81
2 cwt. Super + 1 cwt. S.A.	38.47	38.51	0.04
2 cwt. S.A.	37.28	36.89	—0.39
1 cwt. Super + 2 cwt. S.A.	37.83	39.09	1.26
2 cwt. Super + 2 cwt. S.A.	36.89	38.55	1.66
Mean of Plots with and without late Nitrogen	37.01	37.89	0.88
Plots without Phosphate		36.38	
Plots with 1 cwt. Super		37.74	
Plots with 2 cwt. Super		38.25	

The average gain in yield of 0.88 tons per acre resulting from late Sulphate of ammonia might be due to chance about once in 100 times.

The average gains in yield 1.36 tons per acre and 1.87 tons per acre due to single and double phosphate respectively might be due to chance less than once in 100 times.

The average effect of early treatment with sulphate of ammonia cannot be established as statistically significant.

Gaynors—Elms No. 6.

Soil Type—Fitches clay. Variety Ba. 11569.

Planted 12/11/37.

Reaped as Plant Cane 22/2/39.

Rainfall (15½ months) 55 ins.

Layout—Eight randomised blocks of 9 treatments with late nitrogen half plots.

Area of Half Plots 1/64 Acres.

Main Manurial Treatments per Acre 14/12/37	Yields of Cane Tons per Acre		
	No late S.A.	1½ cwt. late S.A.	Gain from late S.A.
Nil	23.52	22.04	—1.48
1 cwt. Super	23.47	23.59	0.12
2 cwt. Super	22.48	22.60	0.12
1 cwt. S.A.	22.93	21.44	—1.49
1 cwt. Super + 1 cwt. S.A.	22.36	21.74	—0.62
2 cwt. Super + 1 cwt. S.A.	23.61	24.84	1.23
2 cwt. S.A.	20.98	21.98	1.00
1 cwt. Super + 2 cwt. S.A.	21.89	22.70	0.81
2 cwt. Super + 2 cwt. S.A.	21.36	23.97	2.61
Mean of Plots with and without late Nitrogen	22.51	22.77	0.26
Mean of Plots without Phosphate		22.15	
Mean of Plots with 1 cwt. Super		22.63	
Mean of Plots with 2 cwt. Super		23.15	

Neither early nor late nitrogen have exerted any appreciable effect on yield. The small increases in yield due to superphosphate cannot be established as statistically significant.

VII. Sulphate of Ammonia on Plant Canes and Ratoons and residual effects of late Sulphate of Ammonia applied to the plant canes.

Estate—Belvidere. Byams No. 12.
Soil Type—Bendal clay. Variety B.H.10.12
Planted 3/12/36.
Reaped as Plant Cane 6/3/38.
Reaped as 1st Ratoons 21/3/39.
Rainfall as plant canes (15 months) 61 ins.
Rainfall as 1st Ratoons (12½ months) 60 ins.
Layout—Three 4 x 4 Latin Squares with early nitrogen half plots as plant canes and same half plots as nitrogen half plots as ratoons.
Half Plots Area 1/33 Acres.

As plant canes all plots received a basal treatment of 2 cwt. Super and 2 cwt. Sulphate of potash. As ratoons they received a basal treatment of 1½ cwt. Super and 1½ cwt. Sulphate of potash.

Late applica- tions to Plant Cane per acre	Yields of Cane Plant Canes			Tons per Acre 1st Ratoons		
	No early S.A.	2 cwt. early S.A.	All Plots	No S.A.	1½ cwt. S.A.	All Plots
Nil	24.52	25.36	24.94	15.01	20.99	18.00
1 cwt.	25.64	27.95	26.80	14.42	21.93	18.18
2 cwt.	26.47	27.90	27.19	15.04	22.61	18.83
3 cwt.	27.72	28.60	28.16	16.77	23.01	19.89
Means of Plots with and with- out early Nitro- gen and with and without S.A. to ratoons	26.09	27.45	—	15.31	22.14	—

The average immediate and residual gains in yield from the late dressing of sulphate of ammonia viz 2.44 tons and 0.97 tons per acre respectively might be due to chance less than once in 100 times.

The average gains from early sulphate of ammonia 1.36 tons per acre in the case of plant canes and 6.83 tons per acre in the case of first ratoons might be due to chance far less than once in 100 times.

VIII. Phosphate and Potash in the presence of Basal Nitrogen.

Estate—Langfords No. 26.
Soil Type—Fitches clay. Variety Ba.11569.
Planted 26/11/36.
Reaped as Plant Cane 22/2/38.
Reaped as 1st Ratoons 11/3/39.
Rainfall as Plant Canes (15 months) 50 ins.
Rainfall as 1st Ratoons (12½ months) 48 ins.
Layout—Three 4 x 4 Latin Squares with phosphate and potash half plots as ratoons.
Area of Half Plot 1/40.4 Acres.

Manurial Treatment per Acre to plant Canes in addition to 2 cwt. S.A. early and 2 cwt. S.A. late	Yield of Canes. Tons per Acre.		1st Ratoons. 1 cwt. S.A. 1 cwt. Super 1 cwt. Sulphate of Potash.
	Plant Canes.	1 cwt. S.A.	
Nil	27.54	24.17	24.20
1 cwt. Super	28.38	25.06	25.38
1 cwt. Sulphate of Potash	28.52	25.54	25.36
1 cwt. Super and 1 cwt. Sul- phate of Potash	28.50	24.79	25.99
Means of ratoon plots with and without Super and Sulphate of Potash	—	24.89	25.24

The gains in yield of plant cane from the treatments with superphosphate and potash, 0.41 tons and 0.55 tons respectively and the average gain in yield of 0.35 tons in the ratoon crop resulting from application of phosphate and potash cannot be established as statistically significant. The average residual gain of 0.71 tons ratoon cane from potash applied to the plant canes might be due to chance less than once in 20 times. The residual gain appears to be the larger on the plot treated with phosphate and potash as ratoons.

IX. Potash on Plant Canes and Ratoons and immediate and residual effects of early and late phosphate.

Estate—Ottos No. 25.
 Soil Type—Otto clay. Variety B.H.10.12.
 Planted 3/12/36.
 Reaped as Plant Cane 13/3/38.
 Reaped as 1st Ratoons 26/3/39.
 Rainfall as Plant Canes (15½ months) 71 ins.
 Rainfall as 1st Ratoons (12½ months) 45 ins.
 Layout—Two 6 x 6 Latin Squares with potash half plots.
 Area of Half Plots 1/37.7 Acres.

All plots received basal dressings of 4 cwt S.A. per acre as plant canes and 1½ cwt. as first ratoons.

Superphosphate applied to plant canes per acre	Yields of Cane — Tons per Acre					
	Plant Canes			1st Ratoons		
	No Potash	2 cwt. Sulphate of Potash	All Plots	No Potash	1½ cwt. Sulphate of Potash	All Plots
Nil	26.68	29.16	27.93	12.40	13.47	12.94
1 cwt. early ...	27.00	29.39	28.20	12.49	14.47	13.48
2 cwt. early	28.20	29.44	28.87	14.89	14.21	14.55
1 cwt. late	27.39	29.00	28.19	13.12	14.05	13.59
2 cwt. late	27.13	29.12	28.13	13.35	14.00	13.68
Means of plots with & with- out potash	27.20	29.21		13.11	13.95	
No phosphate plots		27.93			12.94	
Phosphate plots		28.35			13.83	

The average gains in yield resulting from sulphate of potash viz 2.01 tons of plant cane and 0.84 tons of ratoons might be due to chance less than once in 100 and once in 20 times respectively. The average gains from phosphate 0.42 tons in the case of plant cane and 0.89 tons in the case of the ratoons cannot be established as statistically significant. Early treatment with superphosphate appears to be more effective than late treatment.

X. Cultural Experiment

Double versus Single Plants.
 Greencastle Experiment Station.
 Soil Type—Bendal clay. Variety B.726.
 Planted 25/11/37.
 Reaped 11/2/39.
 Rainfall (12½ months) 65 ins.
 Layout—Six randomised blocks with two replicates in each block. Plot Area 1/77.8 Acres.

Rate of Planting				Yield of Plant Canes Tons per Acre
Double Plants	....	....	...	43.76
Single Plants	....	....	...	41.88
Difference	....	....	...	1.88

A difference in yield exceeding 1.50 tons might be due to chance less than once in 20 times.

APPENDIX III.

LAND SETTLEMENT.

Greencastle. At the end of 1939, 101 plots, the total available were occupied. There were no evictions during the year but there were three transfers as a result of the death of the holders.

The land settlement suffered severely as a result of the prolonged drought. Some allottees were discouraged to such an extent by the unfavourable climatic conditions that they neglected their lands. The failure of their crops was thus even more complete than would have been the case had they done their best in spite of bad weather.

Owing to the drought many allottees who habitually manured their ratoon canes with sulphate of ammonia refrained from doing so during 1939 so that loans for the purchase of fertilizer totalled only £63 9. 2. as compared with £146 9. 0. during the preceding year.

Loans totalling £201 17. 0. were made for cultivation and reaping.

During 1939, £23 3. 10. was spent on drainage, £7 15. 6. on internal roads and £1 4. 6. on provision of planting material.

The 1940 crop will be reaped from 171 acres (including 38 acres Plant Cane) and is estimated at about 1,400 tons.

Matthews. At the end of 1939, 119 plots out of a total of 137 were occupied. There were no evictions and no transfers for other reasons during the year.

Sums of £39. 17. 2. and £88. 6. 0. respectively were advanced as loans for fertilizers and for cultivation and reaping.

During the year £10. 17. 6. was spent on care of internal roads.

The 1940 crop will be reaped from 155 acres (including 38 acres Plant Cane) and is estimated at about 900 tons.

Jonas's. At the end of 1939, 64 plots, the total available were occupied. There were no evictions and no transfers for other reasons during the year.

During the year £12. 16. 8. was loaned for purchase of fertilizers and £45 for cultivation and reaping.

The 1940 crop will be reaped from 85 acres (including 37 acres Plant Cane) and is estimated at about 1,000 tons.

The following Table shows the crops, the total proceeds and the allocation of the proceeds from the three Land Settlements above described and from the Folly for the period under review.

Settlement.	Ton- nage.	Total Value of Canes.	Loans Repaid.	Rents Deducted.	Marketing Charges.*	Net Proceeds Paid.	Balance Unpaid.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Greencastle	2,713	1,899 1 8½	246 10 3	255 6 2½	14 3 1	1,382 19 4	0 2 10
Matthews	1,175	960 7 6	73 2 0½	92 15 1	34 5 4½	760 2 6½	0 2 5½
Jonas'	1,012	852 11 0	30 6 7	79 0 5	29 10 6	713 11 11½	0 1 6½
The Folly	20	14 4 2½	—	5 4 1½	10 8½	8 9 3	0 0 1½
Total	4,920	3,726 4 5	349 18 10½	432 5 10	78 9 8	2,865 3 1	0 6 11½

* Greencastle. ½d. Contribution to Sugar Cane Investigation Committee.

¾d. per ton weighing.

Matthews. Weighing 1d. Packing 4d. Supervision 2d.
 Jonas's Weighing 1d. Packing 4d. Supervision 2d.
 Folly Weighing ¾d. Packing 4d. Supervision 2d.

The total gross receipts amounted to £3,726 4. 5. The packing, weighing and supervision charges amounted to £78 9. 8. and unpaid balances to 6. 11½, so that the allottees received £3,647 7. 9½ either in cash, loans, or in instalments of the purchase price of their plots.

APPENDIX IV.

METEOROLOGICAL

Return of Rainfall of the Following Places in Antigua from 1st January to 31st December, 1939.

No.	Station.	January	February	March	April.	May.	June.	July.	August.	September	October.	November.	December.	Total.
1	Vernons	2.31	1.35	2.10	0.35	1.46	1.29	3.02	1.86	1.50	15.58	5.72	1.81	38.35
2	Greencastle Expt. Station	1.54	1.60	2.40	0.29	0.92	0.97	3.09	2.10	2.31	12.70	6.79	2.90	37.61
3	Creekside	2.02	1.34	1.80	0.43	0.60	1.40	3.76	2.64	2.27	11.91	6.57	2.37	37.11
4	Carlisle	1.81	1.68	1.82	0.27	1.12	1.32	4.67	1.22	2.27	9.58	8.82	1.80	36.38
5	Sandersons	1.44	1.20	2.46	0.12	0.96	0.99	3.80	1.99	1.93	13.92	5.33	1.94	36.08
6	Belvidere	1.46	1.63	2.02	0.19	0.67	1.12	3.95	2.27	2.18	11.50	5.85	2.39	35.23
7	Body Ponds	1.56	1.99	2.61	0.28	0.49	1.55	4.09	2.07	1.06	9.33	6.56	3.29	34.88
8	Wallings Dam	3.91	1.35	2.20	0.43	1.53	2.02	2.73	1.67	1.84	9.12	6.49	1.30	34.59
9	Ffryes	2.10	1.16	3.05	0.00	1.19	1.13	3.51	1.54	2.16	11.00	5.28	2.40	34.52
10	Wallings Hill	4.63	1.37	2.13	0.45	1.49	2.00	2.89	1.74	1.79	9.03	6.48	1.12	34.52
11	New Division	2.47	2.21	1.85	0.80	0.95	1.10	3.45	2.31	4.24	6.37	5.78	2.81	34.34
12	Delaps	2.53	1.10	2.66	0.30	0.94	1.28	3.55	1.42	0.94	10.97	6.15	2.48	34.32
13	Pattersons	2.21	1.51	3.04	0.34	1.95	2.03	3.26	1.26	2.29	8.83	5.35	2.14	34.21
14	The Diamond	1.08	1.02	2.54	0.08	1.16	1.11	3.20	1.45	1.99	12.82	4.87	2.78	34.10
15	Blakes	2.20	0.87	2.89	0.50	1.32	1.22	2.91	1.28	2.06	9.93	6.42	2.44	34.04
16	Long Lane	2.07	1.33	2.52	0.00	1.22	1.21	3.43	1.31	1.23	12.69	4.71	2.03	33.75
17	Antigua Sugar Factory	1.62	0.79	1.67	0.68	1.17	1.30	3.45	1.15	1.36	11.03	7.41	2.05	33.68
18	Botanic Station	1.86	1.44	1.33	0.57	1.34	1.51	3.92	1.30	3.68	7.05	6.36	2.72	33.08
19	Betty's Hope Garden	1.33	1.12	2.19	0.51	0.88	0.98	3.17	1.92	2.04	12.15	4.63	1.56	32.48
20	Bennett Bryson's Office	1.76	1.50	1.33	0.58	1.38	0.97	3.77	1.31	3.68	5.13	8.73	2.02	32.16
21	North Sound	2.04	0.85	1.04	0.42	0.89	0.68	3.02	1.26	1.18	15.04	4.13	1.59	32.14
22	Betty's Hope	1.42	0.97	1.73	0.22	1.09	0.97	3.71	1.46	1.62	11.67	5.16	1.45	31.47
23	Donovans	2.08	0.86	1.64	0.40	1.09	1.28	3.09	1.45	1.62	10.18	5.47	2.09	31.25
24	Parham N. Work	1.91	1.09	1.60	0.27	1.39	1.04	2.96	1.45	1.09	12.82	4.30	1.31	31.23
25	Bellevue	0.91	0.89	1.57	0.34	0.64	0.58	3.37	1.06	1.21	14.66	4.13	1.82	31.18
26	Piccadilly	1.97	1.59	3.08	0.31	1.64	2.29	2.95	1.79	1.35	7.29	4.98	1.94	31.18
27	Burkes	1.14	0.87	1.94	0.12	0.64	1.15	3.34	1.42	1.01	11.58	6.35	1.57	31.13
28	Blubber Valley	1.52	1.85	1.19	0.20	0.34	0.69	4.13	1.78	3.43	9.43	3.88	2.13	30.57
29	Lyons	1.46	0.65	2.90	0.03	1.14	0.83	3.43	0.94	2.92	8.85	5.10	2.01	30.29
30	Cedar Valley	1.61	1.44	1.27	0.32	0.83	1.01	3.83	1.16	2.06	6.21	7.60	2.57	29.91
31	Fitches Creek	1.12	0.85	1.04	0.23	0.95	0.91	3.18	1.24	2.78	8.39	6.44	2.67	29.80
32	Duers	1.08	0.97	2.27	0.05	0.72	0.65	2.54	1.47	1.26	11.64	4.69	2.30	29.64
33	Pares & Cochranes	1.25	0.72	1.20	0.16	1.30	1.04	3.33	1.51	1.55	11.19	4.98	1.08	29.31

METEOROLOGICAL

Return of Rainfall of the Following Places in Antigua from 1st January to 31st December, 1939.

No.	Station	January	February	March	April	May	June	July.	August	September	October	November	December	Total.
34	Parham Hill ...	1.50	0.89	1.33	0.18	1.32	1.19	2.22	1.07	1.09	12.37	4.37	1.56	29.09
35	Weirs ...	3.69	1.09	0.35	0.12	1.24	1.26	1.91	0.92	2.00	8.59	5.35	1.51	28.03
36	Paynters ...	1.30	0.99	1.36	0.26	1.11	1.08	3.02	0.83	1.31	7.71	6.27	2.65	27.89
37	Yeptons ...	1.21	1.61	1.29	0.18	0.86	1.02	3.27	1.78	2.74	5.51	6.87	1.53	27.87
38	Blackmans ...	1.60	0.58	0.91	0.19	0.92	1.19	2.96	0.41	0.51	12.24	4.56	1.77	27.84
39	Gilberts ...	1.53	0.94	1.14	0.28	0.86	1.04	2.74	1.14	2.34	8.67	5.44	1.65	27.77
40	Collins ...	1.04	0.76	2.30	0.06	0.56	0.75	2.36	1.59	1.15	10.47	4.87	1.59	27.50
41	Yorkes ...	1.86	1.10	1.38	0.16	0.36	0.38	2.91	1.90	4.43	7.01	3.75	2.19	27.43
42	Ottos ...	1.47	0.93	0.69	0.67	1.74	0.53	1.39	0.92	3.70	8.35	5.65	1.39	27.43
43	Cochranes and Thomases ...	1.88	0.79	2.14	0.33	0.75	1.12	2.05	0.66	2.52	7.37	5.16	2.35	27.12
44	Langfords ...	1.14	1.05	1.75	0.11	0.67	0.65	3.10	0.99	1.76	6.29	7.29	2.30	27.10
45	Willis Freemans ...	1.10	0.73	1.65	0.18	0.49	0.96	2.43	0.92	1.29	9.82	6.29	1.20	27.06
46	The Cotton ...	1.74	1.03	1.29	0.20	0.64	1.22	2.49	1.10	1.59	9.93	4.13	1.54	26.90
47	Marble Hill ...	1.50	1.75	1.45	0.35	0.74	0.72	3.02	0.65	1.75	5.35	7.54	2.05	26.87
48	Morris Loobys ...	2.08	0.75	1.25	0.27	0.30	1.15	2.19	0.89	0.99	8.71	5.04	2.03	25.65
49	Parham Lodge ...	1.50	1.10	0.90	0.32	0.88	1.19	2.31	1.15	0.45	10.60	3.61	1.49	25.50
50	Gaynors ...	1.32	0.66	2.86	0.05	1.26	0.60	2.38	1.06	2.30	7.43	3.68	1.82	25.42
51	Cassada Garden ...	0.98	0.60	1.15	0.25	0.72	0.95	2.50	0.59	0.98	7.03	6.98	2.23	24.96
52	Judges ...	0.96	1.51	0.88	0.00	0.29	0.80	3.16	0.91	1.26	6.53	6.44	1.76	24.50
53	Comfort Hall ...	0.68	0.50	2.73	0.00	0.30	0.62	3.40	0.82	1.11	9.23	3.01	1.57	23.97
54	Mercers Creek ...	1.54	0.43	0.88	0.20	0.51	0.76	1.93	0.50	2.24	7.75	4.18	1.74	22.66
55	Millars ...	0.75	0.45	0.50	0.00	0.30	0.81	3.37	0.55	1.69	6.62	5.63	1.15	21.81
56	Montpelier ...	1.28	0.70	1.59	0.00	0.89	0.74	2.52	0.74	1.98	6.12	3.79	1.36	21.71
57	High Point ...	0.72	0.80	0.94	0.03	0.37	0.71	1.62	0.96	0.98	6.09	5.33	1.57	20.12
58	Winthorpes ...	0.45	1.00	0.54	0.00	0.15	0.79	1.83	0.80	0.99	5.73	4.80	1.15	18.23
59	Thibous ...	0.76	1.06	0.96	0.07	0.19	0.84	1.45	0.65	0.95	4.76	4.38	1.33	17.40
	Barbuda ...	2.34	0.80	1.16	0.36	1.90	1.05	1.55	2.96	1.29	4.76	5.42	3.13	26.72

AVERAGE RAINFALL 1874—1939.

in	1874	the	average	rainfall	on	41	stations	was	ins.	AVERAGE MONTHLY RAINFALL, 1939.	
	1875	"	"	"	"	40	"	"	31.16		
	1876	"	"	"	"	36	"	"	28.78		
	1877	"	"	"	"	38	"	"	41.98	inches.	
	1878	"	"	"	"	53	"	"	49.05	January	 1.64
	1879	"	"	"	"	52	"	"	47.11		
	1880	"	"	"	"	46	"	"	61.54	February	 1.11
	1881	"	"	"	"	44	"	"	49.68		
	1882	"	"	"	"	45	"	"	53.75	March	 1.72
	1883	"	"	"	"	56	"	"	33.04		
	1884	"	"	"	"	56	"	"	55.51	April	 0.25
	1885	"	"	"	"	53	"	"	43.98		
	1886	"	"	"	"	55	"	"	43.39	May	... 0.91
	1887	"	"	"	"	50	"	"	47.78		
	1888	"	"	"	"	47	"	"	43.68	June	 1.06
	1889	"	"	"	"	50	"	"	44.23		
	1890	"	"	"	"	45	"	"	73.59	July	 3.00
	1891	"	"	"	"	45	"	"	33.00		
	1892	"	"	"	"	53	"	"	50.01	August	 1.29
	1893	"	"	"	"	54	"	"	38.43		
	1894	"	"	"	"	68	"	"	38.69	September	 1.86
	1895	"	"	"	"	69	"	"	38.85		
	1896	"	"	"	"	56	"	"	52.91	October	 9.42
	1897	"	"	"	"	54	"	"	59.85		
	1898	"	"	"	"	66	"	"	39.67	November	5.52
	1899	"	"	"	"	63	"	"	48.85		
	1900	"	"	"	"	64	"	"	47.50	December	 1.92
	1901	"	"	"	"	65	"	"	36.95		
	1902	"	"	"	"	71	"	"	57.61		
	1903	"	"	"	"	68	"	"	58.80		29.70
	1904	"	"	"	"	70	"	"	43.68		
	1905	"	"	"	"	68	"	"	37.01		
	1906	"	"	"	"	66	"	"	31.40		
	1907	"	"	"	"	70	"	"	53.93		
	1908	"	"	"	"	72	"	"	43.45		
	1909	"	"	"	"	70	"	"	43.79		
	1910	"	"	"	"	70	"	"	45.15		
	1911	"	"	"	"	72	"	"	34.77		
	1912	"	"	"	"	72	"	"	36.47		
	1913	"	"	"	"	73	"	"	32.20		
	1914	"	"	"	"	72	"	"	42.76		
	1915	"	"	"	"	75	"	"	36.86		
	1916	"	"	"	"	74	"	"	56.14		
	1917	"	"	"	"	70	"	"	58.23		
	1918	"	"	"	"	70	"	"	36.62		
	1919	"	"	"	"	70	"	"	37.87		
	1920	"	"	"	"	70	"	"	49.56		
	1921	"	"	"	"	74	"	"	30.09		
	1922	"	"	"	"	70	"	"	30.32		
	1923	"	"	"	"	68	"	"	35.14		
	1924	"	"	"	"	67	"	"	32.41		
	1925	"	"	"	"	68	"	"	41.57		
	1926	"	"	"	"	70	"	"	30.75		
	1927	"	"	"	"	67	"	"	50.20		
	1928	"	"	"	"	63	"	"	45.84		
	1929	"	"	"	"	66	"	"	33.24		
	1930	"	"	"	"	59	"	"	40.78		
	1931	"	"	"	"	63	"	"	25.51		
	1932	"	"	"	"	63	"	"	48.62		
	1933	"	"	"	"	59	"	"	58.47		
	1934	"	"	"	"	60	"	"	41.50		
	1935	"	"	"	"	57	"	"	41.86		
	1936	"	"	"	"	60	"	"	38.31		
	1937	"	"	"	"	59	"	"	59.99		
	1938	"	"	"	"	58	"	"	47.28		
	1939	"	"	"	"	59	"	"	44.75		
									29.70		

The average rainfall for 66 years is 43.49 inches, so that the rainfall for the year 1939 is 13.79 inches ~~above~~ the average.

below

METEOROLOGICAL SUMMARY 1939.

Kept at the Botanic Station, Antigua.

MONTH	THERMOMETER						BAROMETER READING		RAINFALL AT BOTANIC STATION	BAROMETER CORRECTED		THERMOMETER	
	DRY		WET		RELATIVE HUMIDITY		MAXIMUM	MINIMUM		HIGHEST	LOWEST	HIGHEST MAX.	LOWEST MIN.
	9 A.M.	3 P.M.	9 A.M.	3 P.M.	9 A.M.	3 P.M.							
January	77.6	78.2	71.7	72.3	74.5	74.8	80.7	70.9	30.110	30.027	29.991	83.0	69.0
February	78.2	78.2	71.0	71.3	69.0	70.9	81.2	71.4	30.115	30.046	29.987	85.0	68.0
March	78.3	79.1	71.3	71.7	69.8	68.3	81.1	71.0	30.092	30.015	29.946	84.0	68.0
April	80.0	81.0	72.9	73.5	69.9	68.9	87.3	72.6	30.108	30.038	29.940	88.0	70.0
May	81.4	82.5	74.4	75.0	71.0	69.4	83.9	73.8	30.068	30.009	29.960	86.0	70.0
June	82.2	83.3	76.2	77.4	74.8	74.9	85.2	76.0	30.076	30.029	29.961	90.0	70.0
July	83.6	85.3	77.8	78.9	76.3	74.8	86.5	76.3	30.084	30.037	29.992	92.0	72.0
August	85.0	86.7	79.2	80.6	77.0	76.3	88.4	77.5	30.075	29.987	29.939	92.0	76.0
September	85.5	87.0	80.5	80.8	79.8	75.8	88.1	77.8	30.070	29.998	29.923	92.0	74.0
October	82.2	83.4	78.8	79.3	85.9	83.4	86.4	76.4	29.965	29.886	29.533	92.0	72.0
November	80.9	80.9	77.5	77.2	85.3	84.4	83.4	74.6	30.004	29.918	29.857	86.0	72.0
December	80.3	80.0	75.6	75.6	80.1	81.2	82.4	73.4	30.061	29.992	29.950	88.0	70.0
Means for the Year	81.3	82.1	75.6	76.1	76.1	75.3	84.6	74.3	30.069	29.999			33.08

Highest Maximum Temperature = 92° on 28th July, 7, 8, 9 and 31st Aug., 21st Sept. and 1st Oct.
 Lowest Minimum Temperature = 68° on 15, 18 and 21st February and 13th March.
 Highest Barometer (corr.) = 30.187 on 7th March.
 Lowest Barometer (corr.) = 29.533 on 16th October.
 Greatest Rainfall in 24 hours = 2.19 ins on 16th November.